TSG-SA Working Group 1 (Services) meeting #8 TSG S1 (00) 370

Beijing, China: 10-14th April 2000 Agenda Item: 6.12

Source: TSG SA WG1

Title: Liaison statement on hexadecimal IMEI format

To: SA WG5, CN WG1, CN WG4, RAN WG2, RAN WG3, GSM Association

CC: SA WG2,

Contact: tommi.kokkola@nokia.com

S1 received the attached contribution to change IMEI format. S1 would like other WGs and GSM assiciation to study the proposal and comment.

Change of the coding is proposed for release 2000. S1 asks the WGs to consider if this late proposal for R99 would be possible so that all the UMTS terminals could use this coding from the beginning.

3GPP TSG-SA, WG1 meeting #8 TDoc S1#8 (00)0275

Peking, China, April 10-15, 2000

Source: Nokia

Title: Proposal to modify IMEI format

Background

The current IMEI format is structured in the following way:

- Type Approval Code (TAC): 6 digits. The first 2 digits constitute the code allocated to Notified Body = Reporting Body Identifier(1900 MHz phones in USA and test terminals have different coding)
- Final Assembly Code (FAC): 2 digits
- Serial Number: 6 digits
- **Check digit**

These digits have been presented in BCD format. New Type Approval Codes have been issued with a 6 BCD digits Serial Number set (1Million units) is not sufficient any more. This format has served well and no problems have been envisaged as far as an unambiguous terminal coding for GSM is concerned. However, the introduction of the IMEI into 3G mobile terminal identification changes the situation as soon as a great variety of products manufactured in larger volumes will flow to market place. Nevertheless, any modification in the IMEI coding must not jeopardize smooth migration from one mobile generation to the next one.

Proposal

Given the strong reliance on the interoperability with legacy products no change to IMEI length or structure is considered feasible. In contrast, the coding format of the Serial Number is proposed to be modified.

- Instead using BCD, a **hexadecimal** code format is proposed. It would offer a capacity of 16.7 Million units manufactured with one Type Approval Code.
- TAC would set a trigger for interpretation (Network would identify from which TAC number onwards a serial number would be interpreted as binary presentation)

This proposal will require modifications to network management system for both installed and new (GSM and 3G). But no modifications to existing Rel '99 signalling is foreseen.

Change of coding is proposed for release 2000. However, change should be considered already for release 1999 in order to allow new IME coding in all 3G terminals.

Attached CR to 22.016 for Release 2000.

3GPP SA

CHANGE REQUEST Please see embedded help file at the bottom of t page for instructions on how to fill in this form co

22.016CR 002 Current Version: 3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number	CR number as allocated by MCC support team

For submission to: TSG#8	for approval X	strategic	(for
list expected approval meeting # here	for information	non-strategic	use

Form: CR cover sheet, version 2 for 3GPP and SMG The latest version of this form is available from: ftp://ftp.3gpp.org/Inform Fo

Proposed change affects: (U)SIM ME x UTRAN / Radio Core Netw
(at least one should be marked with an X)

Source: Nokia Date: 10/4/00

Subject: IMEI coding

Work item:

Category:	F Correction		Release: Phase 2
	A Corresponds to a correction in an earlier release		Release 9€
(only one category	B Addition of feature		Release 9ᵀ
shall be marked	C Functional modification of feature	X	Release 9ᵀ
with an X)	D Editorial modification		Release 9ᵀ
			Release 0(

Reason for change: Change of IMEI coding from decimal format to **hexadecimal**.

Clauses affected: Annex A:

Other specs affected:	Other 3G core specifications	→ List of CRs:
	Other GSM core specifications	→ List of CRs:
	MS test specifications	→ List of CRs:
	BSS test specifications	→ List of CRs:
	O&M specifications	→ List of CRs:

Other comments:

<-------- double-click here for help and instructions on how to create a CR.

Annex A (normative):
IMEI **Check Digit** computation

A.1 Representation of IMEI

The International Mobile station Equipment Identity and Software Version Number (IMEISV), as defined in TS 23.003, is a 16 **digit hexadecimal** number composed of four distinct elements:

- a 6 **digit** Type Approval Code (TAC);

- a 2 **digit** Final Assembly Code (FAC);

- a 6 **digit** Serial Number (SNR); and

- a 2 **digit** Software Version Number (SVN).

The IMEISV is formed by concatenating these four elements as illustrated below:

Figure A.1: Composition of the IMEISV

The IMEI is complemented by a **check digit** as defined in section 3. The modulus 16 **Luhn Check Digit** (CD) is computed on the 14 most significant **hexadecimal** digits of the IMEISV, that is on the value obtained by ignoring the SVN digits.

The method for computing the **Luhn check** is defined in Annex B of the International Standard "Identification cards - Numbering system and registration procedure for issuer identifiers" (ISO/IEC 7812) [3]. The modulus 16 **Luhn Check Digit** is identical, but number base has been transformed from 10 to 16.

In order to specify precisely how the CD is computed for the IMEI, it is necessary to label the individual digits of the IMEISV, excluding the SVN. This is done as follows:

The (14 most significant) digits of the IMEISV are labelled D14 D13 ... D1, where:

- TAC = D14 D13 ... D9 (with D9 the least significant **digit** of TAC);

- FAC = D8 D7 (with D7 the least significant **digit** of FAC); and

- SNR = D6 D5 ... D1 (with D1 the least significant **digit** of SNR).

Note: Even though all digits D1□ D14 are changed to use **hexadecimal** coding, this has no effect to the previously assigned values of all fields when the fields were using BCD coding. The same code values can still be used for the previously assigned codes. The **hexadecimal** coding allows more codes to be used for all fields. Especially this applies to the SNR field, which has number space of 2^24 = 16,777,216 units □ with BCD coding the number space is 1,000,000 units.

A.2 Computation of CD for an IMEI

Computation of CD from the IMEI proceeds as follows:

Step 1: Double the values of the odd labelled digits H1, H3, H5, ... H13 of the IMEI using **hexadecimal** number base.

Step 2: Add together the individual digits of all the seven numbers obtained in Step 1, and then add this sum to the sum of all the even labelled digits H2, H4, H6, ... H14 of the IMEI using **hexadecimal** number base.

Step 3: If the number obtained in Step 2 ends in 0, then set CD to be 0. If the number obtained in Step 2 does not end in 0, then set CD to be that number subtracted from the next higher **hexadecimal** number which does end in 0.

A.3 Example of computation

IMEI (14 most significant digits):

TAC	FAC	SNR
H14 H13 H12 H11 H10 H9	H8 H7	H6 H5 H4 H3 H2 H1
2 6 0 5 3 1	7 9	3 8 D 3 E 3

Step 1:

2 6 0 5 3 1	7 9	3 8 D 3 E 3
x2 x2 x2	x2	x2 x2 x2
C A 2	12	10 6 6

Step 2:

2 + C + 0 + A + 3 + 2 + 7 + 1 + 2 + 3 + 1 + 0 + D + 6 + E + 6 = 52

Step 3:

CD = 60 - 52 = E

TSG-SA Working Group 1 (Services) meeting #8 **TSG S1 (00) 370**
Beijing, China: 10-14th April 2000 **Agenda Item: 6.12**
SOURCE: TSG SA WG1

TITLE: LIAISON STATEMENT ON HEXADECIMAL IMEI FORMAT

TO: SA WG5, CN WG1, CN WG4, RAN WG2, RAN WG3, GSM ASSOCIATION

CC: SA WG2,

Contact: tommi.kokkola@nokia.com

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3GPP TSG-SA, WG1 meeting #8 **TDoc S1#8 (00)0275**
Peking, China, April 10-15, 2000

Source: **Nokia**

Title: Proposal to modify IMEI format

Background

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Proposal

Given the strong reliance on the interoperability with legacy products no change to IMEI length or structure is considered feasible. In contrast, the coding format of the Serial Number is proposed to be modified.

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Attached CR to 22.016 for Release 2000.

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

22.016 CR 002 Current Version: 3.1.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: TSG#8 *list expected approval meeting # here ↑*	for approval [X]	strategic [ ] *(for SMG use only)*
	for information [ ]	non-strategic [ ]

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [X] UTRAN / Radio [ ] Core Network [X]

Source: Nokia **Date:** 10/4/00

Subject: IMEI coding

Work item:

Category: *(only one category shall be marked with an X)*

F	Correction	[ ]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[X]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[ ]
Release 00	[X]

Reason for change: Change of IMEI coding from decimal format to hexadecimal.

Clauses affected: Annex A:

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
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BSS test specifications	[ ]	→ List of CRs:
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Other comments:

help.doc

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Annex A (normative): IMEI Check Digit computation

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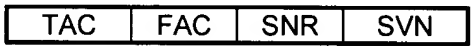

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